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Evaluation of a physiotherapy-led group rehabilitation intervention for adults living with HIV: referrals, adherence and outcomes

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Abstract

HIV is characterised by episodes of disability. We report a novel hospital outpatient rehabilitation intervention, combining physiotherapy-led group exercise and education for people living with HIV (PLWH). This observational study evaluated routine delivery of the 10-week intervention in terms of referral patterns, rehabilitation goals, adherence to the intervention and change in patient outcomes. Measurements taken at baseline & 10 weeks included locomotor performance and functional capacity (6 minute walk test; 6MWT), flexibility (sit and reach test), upper and lower limb strength (1 repetition max) and health related quality of life (HRQOL) using Functional Assessment of HIV infection (FAHI). Adherence was defined as attending ≥8/20 sessions, with reasons for non-adherence identified in structured retrospective telephone interviews. Goal Attainment Scale (GAS) measured progression to individual goals. A total of 92 referrals were mostly for musculoskeletal (25.0%), oncological (19.6%) or cardio-metabolic (18.5%) reasons among a mostly male (81.5%), Caucasian (70.7%) and ageing (mean 51.5 years) population. Common themed rehabilitation goals included improving body image, participation, mobility, health/fitness and function. Adherence was achieved by 42 (46%) patients, with open access utilised by 34 patients; returning (n=19) or restarting when non-adherent (n=15). Post-intervention measurements were collected for n=37 (40%) patients demonstrated improvements in 6MWT distance ($p<0.001$), flexibility ($p<0.001$), strength in triceps ($p<0.001$), biceps ($p<0.001$), Lattisimus Dorsi ($p<0.001$), shoulder-press ($p<0.001$), chest-press ($p<0.001$), and leg-press ($p<0.001$). HRQOL improved in total score ($p<0.001$), physical ($p<0.001$), emotional ($p<0.001$) and functional ($p=0.065$) subscales. Extent of goal progression demonstrated 83% of goals scoring “expected” (n=57), “somewhat more”

(n=31) or “much more” (n=14) level of achievement. Reasons for non-adherence from 21 telephone interviews identified physical health challenges, individual factors and time or location issues. This novel rehabilitation approach for PLWH improved function, quality of life and goal attainment among those who completed the intervention. Sub-optimal adherence likely relates to episodic disability.

Key Words:

HIV, Physiotherapy, Rehabilitation, Exercise, Self-Management, Adherence

Introduction:

HIV is increasingly considered a chronic condition, characterised by episodes of disability (K. K. O'Brien, Bayoumi, Strike, Young, & Davis, 2008). People living with HIV (PLWH) report a high prevalence of disability, defined as impairments, activity limitations and participation restrictions (Rusch et al., 2004) complicated by accumulation of comorbid conditions (Gysels et al., 2012; Rodriguez-Penney et al., 2013). A rehabilitation approach provided by Physiotherapists, Occupational Therapists and Speech and Language Therapists is recommended to support these physical, mental and social challenges (K. K. O'Brien, Solomon, Trentham, et al., 2014)

Rehabilitation is defined as services that assist individuals who may experience disability, to achieve and maintain optimal functioning (Worthington, Myers, O'Brien, Nixon, & Cockerill, 2005). Combined aerobic and resistive exercise is a safe and beneficial rehabilitation intervention for PLWH (Nixon, O'Brien, Glazier, & Tynan, 2005; K. O'Brien, Nixon, Glazier, & Tynan, 2004). Exercise may be recommended to address the multidimensional and episodic nature of disability attributed to HIV and its comorbidities e.g. cardiovascular disease, cancer, bone/joint disorders and cognitive impairment (K. K. O'Brien, Solomon, Trentham, et al., 2014).

HIV outpatients report high prevalence of poor physical function; including mobility problems, self-care problems and pain (Downing et al., 2012). Poor physical function is

associated with worse quality of life (Erlandson et al., 2014) and greater mortality among PLWH (Lacasse, Goldstein, Lasserson, & Martin, 2006). Therefore, a priority is to establish and evaluate rehabilitation interventions and targeted exercise programmes for this group (Erlandson et al., 2014; K. O'Brien, Wilkins, Zack, & Solomon, 2010; K. K. O'Brien, Ibanez-Carrasco, et al., 2014).

Supervised group exercise and education interventions in cardiac and pulmonary rehabilitation are clinically effective (Jolliffe et al., 2001; Lacasse et al., 2006) cost saving (Fidan, Unal, Critchley, & Capewell, 2007; Griffiths, Phillips, Davies, Burr, & Campbell, 2001) improve health related quality of life (HRQOL) (Davies et al., 2010; Lacasse et al., 2006) and reduce health service utilisation (Davies et al., 2010; Seymour et al., 2010). Although supervised group exercise for PLWH improves self-efficacy, HRQOL, functional capacity and cardiovascular fitness (Fillipas, Oldmeadow, Bailey, & Cherry, 2006; Galantino et al., 2005; Hand et al., 2008; Petroczi, Hawkins, Jones, & Naughton, 2010), data is limited in the UK, with below desired adherence reported (Jones et al., 2012; Petroczi et al., 2010). Internationally, no known rehabilitation intervention combines exercise and education for PLWH.

Here we report a novel hospital outpatient rehabilitation intervention, combining physiotherapy-led group exercise and education, for PLWH: the “Kobler Rehabilitation Class”. This study aimed to evaluate the intervention in terms of 1) referral patterns; 2) patient characteristics; 3) individual goals of therapy; 4) adherence rate and 5) change over time in biometric/patient-reported outcomes. Secondary exploratory objectives included; 6) reasons for non-adherence; 7) predictors of adherence and 8) predictors of attendance.

Data from this service evaluation will determine the potential effectiveness of this novel intervention, and the plausibility of clinical trial experimental evaluation.

Methods

Design

This is an observational, prospective single-group study of a cohort of patients referred to the intervention.

The Intervention Programme and Components

The Kobler Rehabilitation Class is a physiotherapy-led, supervised group exercise intervention and educational "self-management programme" provided in a hospital setting in the UK (see Figure 1). The service is modeled from existing HIV exercise programmes (Fillipas et al., 2006; Petroczi et al., 2010), UK care standards for PLWH ("Standards of Care for People Living with HIV," 2013) and modified using service-user views (Brown, Nelson, & Claffey, 2014). Any member of the multidisciplinary hospital team can refer patients for health challenges associated with HIV, treatments and comorbidities. Referred patients receive individual assessment, and individual treatment if required, within an HIV specialist Physiotherapy clinic, before being invited to attend the Kobler Rehabilitation Class through a "shared decision-making process"(Elwyn et al., 2012) and undertaking Goal Attainment Scaling (GAS)(Krasny-Pacini, Hiebel, Pauly, Godon, & Chevignard, 2013; Turner-Stokes, 2009). Patients are invited to attend twice weekly for 10 weeks, with measurements completed at baseline (week 0) and post-intervention (week 10). The rolling programme has capacity for two new patients per week, with patients encouraged to continue

independent regular physical activity. Those unable to attend are invited to restart when appropriate and open access is available to patients wishing to return after 10 weeks.

Insert Figure 1 here

The exercise component consists of twice-weekly, 60-minute sessions, supervised by two Physiotherapists. The intervention begins with a 5-minute standard flexibility regime to prevent injury. Combined aerobic and progressive resistive exercises are supervised and individually modified for 45-minutes. Neuromotor exercises (eg: balance, coordination or gait) and additional tailored exercises are prescribed as per individual need. Aerobic exercise options comprise cross-trainer, rower, treadmill and static cycling. Resistive exercise options consist of leg press, pulley based multi-gym, dumbbells ranging from 1-15kg and bodyweight exercises (eg: sit to stand or heel raises). The session ends with a 10-minute standard flexibility regimen and guided relaxation (lying or sitting). Patients are encouraged to exercise between moderate to vigorous intensity using the BORG rating of perceived exertion scale (Borg, 1970), dependent upon symptoms and impairments. Resistance exercise intensity is aimed at 70% of 1 repetition-max (1RM) (Medicine, 2013) for 1-3 sets of 8-15 repetitions, or as able within limitations. Exercises and exertion are scored and self-recorded by patients.

The “self management programme” (see Figure 2) is a once-weekly group session, addressing HIV as a long-term condition. The aim is to signpost available services or resources, enhance self-efficacy and provide peer-support. Each 30-45 minute session occurs before the exercise intervention with topics developed through patient involvement

(Brown et al., 2014). Invited experts support group discussions instead of didactic methods, focusing on collective user-defined needs instead of structured content (Kennedy, Rogers, & Crossley, 2007).

Insert Figure 2 here

Evaluation Procedure

The service evaluation was conducted for all referred patients over 24 months, from September 2012. The following data were collected at week 0 only: reason and source of referral, age, gender and height.

The following data were collected at both week 0 and post-intervention: weight, cardiopulmonary fitness with resting heart rate, body shape circumference at level of the nipple, umbilicus and hips at widest part. Functional capacity and locomotor performance were assessed using the 6-minute walk test (6MWT) (Medicine, 2013) , with course dimensions modified from recommended distance to a single 6m walkway. Muscle strength was assessed using 1-repetition max (1RM) ("ATS Statement: Guidelines for the Six-Minute Walk Test," 2002) for biceps, triceps, shoulder-press, chest-press, latissimus dorsi pull-down and leg-press. Flexibility was assessed using the sit and reach test (Mayorga-Vega, Merino-Marban, & Viciana, 2014). The Functional Assessment of HIV Infection (FAHI) measured HRQOL (Peterman, Cella, Mo, & McCain, 1997) and goal progression was quantified using the GAS system (Borg, 1970).

At week 10, total sessions attended was measured. Structured retrospective telephone interviews identified reasons for non-adherence, defined as attending <8/20 sessions (Petroczi et al., 2010). Interviews were conducted by staff external to the rehabilitation intervention and comprised 10 questions. Questions were modeled on the episodic disability framework that defines dimensions of disability including symptoms and impairments, difficulties with day-to-day activities, challenges to social inclusion and uncertainty (K. K. O'Brien et al., 2008).

Analysis

The analysis of the primary objectives were as follows; 1) referral data were tabulated for both reason and source of referrals; 2) participant characteristics were defined using descriptive analyses, proportions, means and standard deviations as data did not deviate significantly from normality; 3) goals of therapy established at week 0 were analysed thematically with goal progression quantified post-intervention using the non-parametric Steenbeek's Method (Krasny-Pacini et al., 2013); 4) Post-intervention outcomes, including biometric and patient reported outcomes, were assessed for change over time from baseline to post-intervention, using paired t-tests; 5) proportion who were adherent was calculated with adherence defined as attending ≥8/20 sessions (Petroczi et al., 2010).

The analysis of the secondary objectives was as follows; 6) exploring reasons for non-adherence, we reviewed telephone interview feedback to group common themes and reasons for attrition; 7) predictors of adherence were explored by post-hoc multivariable logistic regression. The dependent variable was adherence (yes or no), with independent variables identified as significant at the 25% level in univariate analysis (Altman, 1990)

entered into a multivariable model, and odds ratio and p value reported; 8) predictors of number of sessions attended were explored by post-hoc linear regression, with number of sessions attended as the dependent variable, and procedure for regression analysis as performed in objective 7.

Results

A total of 95 patients were invited to attend the Kobler Rehabilitation Class. Of these 92 (97%) started the intervention and completed baseline measurements.

Referrals and participant characteristics

Referrals were mainly for musculoskeletal, oncological or cardio-metabolic reasons. Physiotherapists, HIV doctors and dieticians were the most common referring professionals (see Table 1). Those starting the intervention were predominantly older males of white ethnicity, with one third having a dual HIV and cancer diagnosis. At baseline assessment, over 50% of patients had overweight or obese BMI ≥25, and 29% of patients could not complete 6 minutes of the 6MWT. Mean total FAHI score and all subscales including physical-, functional-, emotional-, social- and cognitive well-being were worse at baseline compared to prior studies reporting FAHI scores (Peterman et al., 1997; Viala-Danten et al., 2010) including data on adults with HIV and Lymphoma comorbidity (Diamond, Taylor, & Anton-Culver, 2010) .

Insert Table 1 here

For FAHI scores, lower score = worse HRQOL

Goals

Using the GAS goal system, 87 patients established an average of 3 personal goals (range 1-5) at week 0. For evaluation purposes, goals were grouped into themes. Most frequent themes included goals of improving body image (n=57), participation (n=34), mobility (n=32), health/fitness (n=31), employment (n=20), function (n=19), fatigue (n=18) and pain management (n=14). Infrequent themes included sex (n=5), well-being (n=4), smoking cessation (n=3), motivation (n=2), and memory (n=1).

Change Over Time

A total of 37 patients (40%) completed data collection at baseline and post-intervention; 19 patients completed follow-up data at week 10, and 18 patients mean 3 weeks later (range 1-8 weeks). The results of the paired t-test analysis, reported in table 2, demonstrate significant improvements in 6MWT distance, flexibility, strength in all assessed muscle groups, total FAHI scores and FAHI subscales physical well-being and emotional well-being, with a trend towards significance in functional well-being. Total body weight change was recorded for 35 patients. Within normal BMI group (n=15), ≥5% change was observed for weight gain (n=5, 33%) and weight loss (n=1, 7%). Within overweight (n=11) and obese (n=9) BMI groups, ≥5% total body weight loss was observed in 9% (n=1) and 22% (n=2) respectively.

Insert table 2 here

Goal progression was quantified in 36 patients, with 23 (64%) achieving all personal goals at "expected" level or above. All goals were reviewed, considering the extent of change. For the entire sample, 83% of goals scored "expected" level of achievement (n=57), "somewhat more" than expected (n=31) or "much more" than expected achievement (n=14). Remaining goals (17%, n=21) stayed at baseline. Within themes of the top 5 most commonly set goals, "expected", "somewhat more" or "much more" than expected level of achievement was scored in body image (82%, n=14), participation (75%, n=9), mobility (92%, n=11), health/fitness (100%, n=13) and employment (67%, n=8).

Adherence and Attendance

Adherence defined as attending ≥8/20 sessions (16) was achieved by 42 (46%) patients. The median number of sessions attended was 6. Open access was utilised by 34 patients, with 19 (56%) returning following completion of the intervention and 15 (44%) restarting when previously non-adherent.

Telephone interviews were conducted with 21 out of 50 patients classified as non-adherent, with 29 patients not contactable after 3 attempts. Of these, 20 (96%) consented to participate in the telephone interview. Reported reasons for non-adherence were related to themes of physical health challenges, individual factors like exercising independently or "it wasn't for me", and class features such as scheduled time or location. Poor physical and mental health was most frequently rated when invited to attend. Comments regarding the structure or organisation of the class were related to assessments, individual attention, personal factors and staffing.

When asked to categorise reasons for not attending with reference to the episodic disability framework (K. K. O'Brien et al., 2008), physical health challenges, challenges with day-to-day activities and travel/location were most frequently reported. Those interviewed reported the intervention was what they expected (60%), with 62% willing and 48% feeling able to rejoin more frequently. Additional comments were positive and expressed gratitude.

In univariate analysis, a number of variables were significantly associated with the outcomes of adherence and weeks attended. However, in multivariable analysis, for model 1 (adherence) and model 2 (weeks attended), only biceps strength remained significant (Table 3).

Insert Table 3 here

Discussion:

Evaluation of the Kobler rehabilitation class during routine delivery in a hospital setting, main findings are: (a) referral patterns were from a wide range of professionals, for patients with multi-dimensional problems and comorbidities; (b) the majority of patients were male, average age over 50, of white ethnicity, had overweight/obese BMI, with low HRQOL; (c) personal goals were related to body-image, participation, mobility and health/fitness; (d) significant change over time was observed in functional capacity (measured by 6MWT distance), flexibility, strength and HRQOL, with most personal goals achieved, among patients completing post-intervention measurements; (e) adherence at ≥8/20 sessions was achieved by <50% of patients; (f) with open accessibility a third of

patients returned after completion or restarted when non-adherent; (g) reasons for non-adherence were related to physical or mental health challenges, personal factors or travel/location; (h) age and baseline cardiorespiratory, functional, strength (except biceps) and flexibility status did not predict adherence or number of sessions attended.

This novel approach to rehabilitation, including exercise and self-management education for PLWH, improved physical function and HRQOL. Greater physical function has demonstrated a relationship with improved HRQOL (Erlandson et al., 2014), however locomotor performance declines over time (Richert et al., 2014), with poorer 6MWT performance in adults with well-controlled HIV. We observe that this decline can be reversed, with improvements in biometric functional capacity, strength, flexibility and self-reported physical well-being in patients completing post-intervention measurements. The improved walking distance observed exceeded clinically important differences for adults with COPD (Redelmeier, Bayoumi, Goldstein, & Guyatt, 1997), elderly patients with heart failure (O'Keeffe, Lye, Donnellan, & Carmichael, 1998), patients with coronary disease (Gremeaux et al., 2011), community dwelling older adults and stroke survivors (Perera, Mody, Woodman, & Studenski, 2006). This evaluation demonstrates that combined exercise and education improves locomotor performance, physical function and HRQOL among PLWH in the UK, adding a new model of intervention to the existing evidence base that exercise as a rehabilitation intervention is beneficial for PLWH (Fillipas et al., 2006; Gomes-Neto, Conceicao, Oliveira Carvalho, & Brites, 2013; Hand et al., 2008; Nixon et al., 2005; K. O'Brien et al., 2004; K. K. O'Brien, Solomon, Trentham, et al., 2014; Petroczi et al., 2010).

Quality of life and emotional well-being significantly improved in patients who completed post-intervention measurements. The improvement compares positively with improved quality of life following pulmonary and cardiac rehabilitation (Davies et al., 2010; Lacasse et al., 2006) and favorable outcomes observed in HIV self-management programmes (Bernardin, Toews, Restall, & Vuongphan, 2013; Millard, Elliott, & Girdler, 2013). The improvement in emotional well-being could relate to the combined exercise and self-management approach, or benefits attributed to participating in group-based activities e.g. peer support (Talbot Rice et al., 2014). The observed improvement in HRQOL may be attributed to low baseline scores compared to other studies (Diamond et al., 2010; Peterman et al., 1997; Viala-Danten et al., 2010). There may be a relationship between disability and HRQOL in PLWH, who need or access rehabilitation, which may be appropriately explored by qualitative interviews.

Patients mostly achieved their goals after rehabilitation, with body image concerns the most frequent goal. Interestingly percentage body mass change was unremarkable within BMI groups, in comparison to >80% of patients who achieved their body image goals. This may represent a relationship between goal attainment and perceived body image, attributed to observed improvements in physical function. There may also be a relationship between mental health and body image, demonstrated by improvements in HRQOL. With highly prevalent depression and body image concerns in men (Blashill & Vander Wal, 2010; Kelly, Langdon, & Serpell, 2009) and women (Blashill & Vander Wal, 2010; Huang et al., 2006) living with HIV, potentially affecting anti-retroviral adherence (Blashill & Vander Wal, 2010), achieving personal goals could represent a marker of success for rehabilitation interventions in PLWH.

Sub-optimal levels of intervention adherence are not unique to this service evaluation. Supervised group exercise (Petroczi et al., 2010) and home-based exercise interventions (Ortiz, Ramirez-Marrero, Rosario, & Venegas-Rios, 2014; Roos, Myezwa, & van Aswegen, 2015) for PLWH, equally observe high levels of attrition. It is hypothesised that the relationship between adherence and exercise, is stronger among those with more favourable views about their goals (Jones et al., 2012). Goal attainment was high within this evaluation, but only in those who completed post-intervention measurements; supporting this hypothesis. Identified barriers from feedback among those classified as non-adherent, included physical and mental health challenges, personal factors or travel/location. With open access however, over a third of patients returned following completion, or restarted when previously non-adherent. Non-adherence, and subsequent restarting, may be associated with episodic disability (K. K. O'Brien et al., 2008). This highlights the importance of rehabilitation interventions for PLWH to be flexible in nature, allowing individuals to attend dependent on their episodes of health and disability. Therefore adherence may not be an appropriate measure of success for HIV rehabilitation interventions.

Outcome measures were successful in measuring change over time, but further investigation is required to evaluate the "self-management programme". The battery of measurements used, presented a time and space burden, reflected by low numbers completing measurements at week 10. Experimental evaluation protocols should carefully determine the primary and secondary outcomes and associated measures to minimise administration burden. Measurement of episodic disability (K. K. O'Brien, Solomon, &

Bayoumi, 2014), may further explain variance in adherence. Further research should establish appropriate measurement tools to identify the need for rehabilitation and cost effectiveness.

There are a number of limitations to our study. Firstly, although the sample is relatively small for the change data, this feasibility adherence and retention data represents an important finding in terms of potential experimental evaluation. Second, there was variability in the time to follow-up data, which may have affected the change score. Third, although we were unable to find any associations between quantitative measures and adherence/weeks attended, the mixed methods approach of this service evaluation means that we were able to collect qualitative description of self-reported reasons. Fourth, no control group limits understanding of which factors impact on observed improvements. This intervention may need adaptation for other contexts e.g. community settings or low and middle-income countries.

Conclusion:

The Kobler Rehabilitation Class is a novel approach to rehabilitation for adults living with HIV, provided in a hospital setting, supervised by Physiotherapists. Physical function and quality of life improved and patients achieved personal goals, among those who completed the intervention. Sub-optimal levels of adherence were observed that may be related to episodic disability experienced by people living with HIV. We conclude that feasibility study of trial evaluation methods is warranted, and that a trial protocol should be informed by the findings in this service evaluation.

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Table 1: Referral patterns and participant characteristics at entry (N=92)

Referral Patterns		
Primary referral reason, n (%)	*Musculoskeletal*	23 (25.0)
	Oncological	18 (19.6)
	Cardio-metabolic	17 (18.5)
	Deconditioning	10 (10.9)
	Psychological	8 (8.7)
	Respiratory	6 (6.5)
	Neurological	5 (5.4)
	Chronic pain	4 (4.3)
	Fatigue	1 (1.1)
Referring profession, n (%)	*Physiotherapist*	32 (34.8)
	HIV Doctor	19 (20.7)
	Dietician	15 (16.3)
	Nurse	10 (10.9)
	Other Doctor	8 (8.7)
	Psychologist	6 (6.5)
	HIV Oncologist	1 (1.1)
	Occupational Therapist	1 (1.1)
Patient Characteristics		
Age (years)	*Min*	32
	Max	75
	Mean	51.5
	SD	9.6
Gender, n (%)	*Male*	75 (81.5)
Ethnicity, n (%)	*White*	65 (70.7)
	Black	26 (28.3)
	Asian	1 (1.08)
Dual HIV/cancer diagnosis, n (%)		31 (33.7)
Height (cm)		Mean=174.9, SD=8.0
Weight (Kg)		Mean=82.8, SD=24.4
Body mass Index (BMI), n (%)		78
	Underweight (BMI <18.5)	4 (5.1)
	Normal (BMI 18-5-24.9)	32 (41.0)
	Overweight (BMI >25)	20 (25.6)
	Obese (BMI >30)	22 (28.2)
Resting heart rate (BPM)		Mean=88.0, SD=17.4
Body shape – nipple (cm)		Mean=101.7, SD=12.9
Body shape – umbilicus (cm)		Mean=97.4, SD=16.6
Body shape – hips widest (cm)		Mean=101.5, SD=13.2
6 minute walk test	*Number of participants who completed 6 minutes, n (%)*	65 (70.7)
	Distance (m)	Min=96 Max=564 Mean=368.4, SD=90.1
6 minute walk test	*Did not complete 6 minutes, n (%)*	27 (29.4)
	Time (seconds)	Min=55

		Max=260 Mean=143, SD=72.0
	Distance (m)	Min=36 Max=300 Mean=106.6, SD=95.2
Strength, 1RM (Kg)	*Triceps*	Mean=6.2, SD=3.4
	Biceps	Mean=8.5, SD=3.5
	Latissimus Dorsi	Mean=18.0, SD=7.4
	Shoulder press	Mean=7.1, SD=3.3
	Chest press	Mean=8.5, SD=4.8
	Leg press	Mean=79.1, SD=47.8
Flexibility (cm)		Mean=-0.32, SD=12.2
FAHI	*Physical well-being (possible score range 0-40)*	Mean =19.5, SD=20.0
	Emotional well-being/living with HIV (possible score range 0-40)	Mean =21.5, SD=10.0
	Functional & global well-being (possible score range 0-52)	Mean =24.4, SD=10.5
	Social well-being (possible score range 0-32)	Mean =17.5, SD= 8.4
	Cognitive functioning (possible score range 0-12)	Mean =7.0, SD=3.1
	Total (possible score range 0-176)	Mean =89.7, SD=31.7

For FAHI scores, lower score = worse HRQOL

Table 2: Change in patient outcomes over time (n=37)

Outcome	Baseline *mean (SD)*	Post Intervention *mean (SD)*	t	P value
Cardiopulmonary Outcomes				
Resting heart rate (beats per min)	86.8 (16.0)	84.4 (14.4)	0.926	0.361
Body Shape				
Circumference at nipple (cm)	101.3 (13.0)	102.2 (13.5)	-1.372	0.179
Circumference at umbilicus (cm)	97.4 (16.3)	96.7 (15.2)	0.728	0.472
Circumference at hips widest (cm)	101.0 (13.3)	100.7 (11.8)	-0.224	0.824
Functional Capacity				
6 minute Walk Test distance (m)	322.5	408.4	-6.208	p<0.001*
Strength (1-Repetition Maximum)				
Triceps	5.8 (2.2)	7.8 (2.5)	-7.474	<0.001*
Biceps	7.9 (2.3)	10.4 (2.7)	-8.145	<0.001*
Latissimus Dorsi	13.9 (5.7)	21.6 (8.6)	-7.032	<0.001*
Shoulder press	6.8 (2.1)	9.2 (3.4)	-5.009	<0.001*
Chest press	7.9 (4.1)	10.6 (4.1)	-3.789	0.001*
Leg press	77.0 (35.2)	123.0 (52.0)	-6.397	<0.001*
Flexibility				
Sit and reach test	-2.1	6.2	-7.497	p<0.001*
Quality of Life (FAHI Questionnaire Scores)				
Physical wellbeing	18.3 (8.5)	22.8 (10.0)	-3.836	<0.001*
Emotional wellbeing	20.3 (9.6)	23.7 (10.3)	-2.391	<0.001*
Functional wellbeing	24.0 (10.6)	27.2 (10.8)	-1.904	0.065^
Social wellbeing	16.3 (6.2)	17.3 (8.0)	-1.453	0.156
Cognitive wellbeing	6.9 (3.2)	7.2 (3.5)	-0.479	0.635
FAHI Total score	85.6 (30.0)	98.1 (33.0)	-3.977	<0.001*

*significant at 0.001% level ^ trend toward significance

Table 3 Predictors of adherence univariate regressions analysis (N=92)

	Model 1 *Dependent variable:* adherent in logistic regression		Model 2 Dependent variable: weeks attended in linear regression	
	Odds ratio (95% CI)	p	b (95% CI)	p
Age (years)	0.980 (0.938, 1.023)	0.357	0.090 (-0.041, 0.221)	0.176
Resting heart rate (BPM)	1.005 (0.979, 1.032)	0.710	-0.054 (-0.129, 0.020)	0.148
6 min walk test completed (yes/no)	0.631 (0.175, 2.278)	0.482	0.938 (-2.769, 4.646)	0.615
6 min walk test distance (m)	1.000 (0.997, 1.004)	0.616	-0.004 (-0.014, 0.006)	0.434
Baseline FAHI total score	1.006 (0.991, 1.020)	0.439	-0.019 (-0.061, 0.022)	0.358
Baseline Triceps (1RM)	1.076 (0.936, 1.238)	0.301	-0.356 (-0.739, 0.027)	0.068
Baseline Biceps (1RM)	1.101 (0.957, 1.267)	0.177	-0.413 (-0.782, -0.044)	0.029*
Baseline Lateral pull-down (1RM)	1.030 (0.964, 1.100)	0.377	-0.149 (-0.337, 0.040)	0.120
Baseline Shoulder press (1RM)	1.075 (0.926, 1.249)	0.309	-0.338 (-0.749, 0.072)	0.105
Baseline Chest press (1RM)	1.066 (0.963, 1.181)	0.220	-0.166 (-0.448, 0.116)	0.244
Baseline Leg press (1RM)	1.002 (0.992, 1.012)	0.707	-0.014 (-0.042, 0.014)	0.328
Flexibility (cm)	1.019 (0.982, 1.057)	0.325	-0.057 (-0.164, 0.049)	0.288

*signifiacnt at 5% level

Figure captions

Figure 1: The Kobler rehabilitation class components
Figure 2: The Self-Management Programme